

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the matter of)	
)	
Establishment of an Interference Temperature)	
Metric to Quantify and Measure Interference and)	ET Docket No. 03-237
To Expand Available Unlicensed Operation in)	
Certain Fixed, Mobile and Satellite Frequency)	
Bands)	

To: The Commission

COMMENTS OF LUXON WIRELESS INC.

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COMMENTS OF LUXON WIRELESS INC.

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COMMENTS OF LUXON WIRELESS INC.

Summary

Luxon Wireless Inc. (“Luxon”), a new wireless broadband operator, commends the Commission for initiating dialogue on new ways the electromagnetic spectrum may be regulated in the future. Luxon participates in this proceeding to express its concerns about the potential harmful effects that may result from imposing an “interference temperature” scheme for licensed spectrum at this time. Specifically, as discussed in greater detail in its Comments, Luxon believes that authorizing unlicensed devices to operate below a given noise floor would:

- Undermine licensees’ rights to maximize the benefits of the secondary market.
- Preclude proper enforcement and remediation of interference by acting without comprehensive testing of theoretical interference management and measurement techniques.
- Hinder entrepreneurs’ efforts to raise funds by introducing a novel and uncertain interference temperature regime that would chill innovation and would substantially lessen competition for universal and affordable broadband services that both the Bush Administration and the Commission have deemed vital national policy objectives.

As an aggregator and future operator of MMDS and ITFS spectrum, Luxon strongly believes that the secondary market should drive use of licensed spectrum below the noise floor. Licensees have exclusive rights to their spectrum in a given area, and are permitted – indeed, encouraged – to advance more efficient and flexible uses by partitioning, disaggregating, leasing and other mechanisms pursuant to private contracts negotiated between the licensee and third-party users. In the market-based system that the Commission has adopted, the rules by which co-extensive unlicensed “underlay” operations can occur should be no different – licensees should have the right to determine

use of all dimensions of its spectrum. Licensees and unlicensed users also would be able to determine for themselves the “temperature” of the noise floor, the locations and power levels of the unlicensed devices and other technical parameters on a market-by-market, band-by-band basis. This result would be consistent with national policies to expand broadband use and encourage flexible use of spectrum.

Absent comprehensive testing of interference listening and response technology, adopting an interference temperature metric at this time would be premature. The three approaches suggested by the Commission as possible ways to mitigate the possibility of harmful interference to licensees are theoretical and untested, and apparently do not account for the difficulties inherent in mobile receivers. Entrepreneurs like Luxon that are developing high-quality, carrier-grade systems to deploy as competitive alternatives cannot provide the reliability that consumers, businesses and educational institutions will increasingly demand.

Adopting an interference temperature metric also would serve as an encumbrance on licensed spectrum and would create uncertainty within the investment community. As a result, less investment capital will be available to competitors. Moreover, licensees will have less incentive and less ability to innovate and remain competitive.

For the foregoing reasons, Luxon urges the Commission to refrain from adopting an interference temperature scheme at this time, and should instead permit licensees to enter into contractual relationships if they wish to make their spectrum available to others.

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COMMENTS OF LUXON WIRELESS INC.

Luxon Wireless Inc. (“Luxon”), by counsel, hereby submits its Comments in response to the Notice of Inquiry and Notice of Proposed Rulemaking in the above-captioned proceeding.¹

Luxon commends the Commission for seeking public input on new ways to regulate portions of the electromagnetic spectrum, and provides its perspective as a new wireless broadband operator concerned about the adverse effects an interference temperature scheme would have on licensees.

Luxon believes that the Commission should not adopt an interference temperature regime at this time because it would:

- Undermine licensees’ rights to maximize the benefits of the secondary market.
- Preclude proper enforcement and remediation of interference by acting without comprehensive testing of theoretical interference management and measurement techniques.
- Hinder entrepreneurs’ efforts to raise funds by introducing a novel and uncertain interference temperature regime that would chill innovation and would substantially lessen competition for universal and affordable broadband services

¹ *Notice of Inquiry and Notice of Proposed Rulemaking*, FCC 03-289, 18 FCC Rcd 25309 (2003) (“*Notice*”). A summary of the *Notice* was published in the Federal Register on January 21, 2004. *See* 69 FR 2863 (2004).

that both the Bush Administration² and the Commission³ have deemed vital national policy objectives.

Introduction

Luxon was established in 2003 to acquire, deploy and commercially operate high-quality, carrier-grade wireless broadband services in the state of Florida and other areas. As a “true start-up” enterprise, Luxon focuses on serving residences and commercial businesses that are underserved – or unserved – by wired solutions such as DSL or cable modem. In addition, Luxon is dedicated to working with educational institutions to develop and provide advanced services such as video-on-demand and campus-wide intranets to benefit elementary, high school and college students. In short, Luxon brings to life the broadband policy goals recently championed by President Bush.⁴

To best achieve its objectives, Luxon has determined that licensed spectrum provides quality and reliability far superior to unlicensed spectrum. In Luxon’s view, customers, businesses and educators will increasingly demand higher speeds, higher capacity and “anytime, anywhere” service. By acquiring rights to spectrum allocated for the licensee’s exclusive use, Luxon can offer service that is not subject to interference caused by other licensees or unlicensed devices.

After making the decision to deploy service using licensed spectrum, Luxon researched and analyzed various equipment options, spectral capacity limitations and spectrum availability, and determined that the MMDS/ITFS spectrum band offers the most suitable combination of

² See “President Bush Meets with First-Time Homebuyers in NM and AZ,” Remarks by the President on Homeownership, March 24, 2004 (“This country needs a national goal for broadband technology, for the spread of broadband technology. . . . You see, the more choices there are, the more prices will go down, and the more prices go down, the more users there will be.”)

³ See News Release, “Powell Comments on President’s Call for Universal, Affordable Broadband,” March 24, 2004.

⁴ See note 2, *supra*.

characteristics necessary for Luxon to accomplish its goals. A critical factor in this decision was the industry's proposals to "re-band" the spectrum to de-interleave the channels and establish segmented spectrum blocks for various flexible uses, and the Commission's initiation of a rulemaking proceeding to consider these and other related proposals.⁵ Luxon believes that the confluence of multiple non-line-of-sight equipment options, a more certain and sensible spectrum and regulatory structure, and the increasing availability of MMDS/ITFS spectrum⁶ will create new opportunities for entrepreneurs like Luxon to offer high-quality broadband services to underserved and unserved areas. Significantly, the combination of these events will create an environment more conducive to raising funds for spectrum acquisition and operations, including service to competitive, underserved and unserved markets.

To date, Luxon has agreed to spectrum lease terms with ITFS licensees in two markets and is in discussions with licensees in five additional markets. Luxon is also raising equity financing to support its business plan and is optimistic that sufficient funding can be obtained in the near future. If the Commission imposes an interference temperature metric scheme and authorizes underlay operations, Luxon and other entrepreneurs will face increased difficulty in raising capital.

Given its efforts to deploy high-quality wireless broadband services, Luxon has a strong interest in seeing that its network and business operations are not compromised by a regulatory environment that could strip licensed spectrum of one of its greatest benefits – exclusive use.

⁵ See *Notice of Proposed Rule Making and Memorandum Opinion and Order*, FCC 03-56, 17 FCC Rcd 6722 (2003) ("MDS/ITFS NPRM").

⁶ The availability of MMDS and ITFS spectrum for lease is a consequence of several factors. First, broadband MMDS/ITFS systems require less spectrum than video systems, which were predicated on the aggregation and collocation of a maximum amount of spectrum (*i.e.*, up to 190 MHz). For broadband systems using MMDS and ITFS channels, Luxon believes that 30 MHz may be sufficient to serve its target markets. Second, in recent bankruptcy transactions in which Nextel agreed to acquire assets from WorldCom and Nucentrix, Nextel did not assume all of the leases, resulting in a large number of MMDS and ITFS licensees that no longer have the support of a commercial lessee. Third, in a number of cases, ITFS leases have expired without renewal or extension by the previous lessee.

Luxon fears that adopting an interference temperature regime in this proceeding could potentially lead to the adoption of an interference temperature in other licensed bands, which in turn would devalue licensed spectrum by adversely affecting its use. The negative impact of permitting unlicensed devices to operate in licensed bands cannot be overstated – it would undermine a licensee’s ability to use the spectrum flexibly, would be premature in the absence of comprehensive testing, would harm investment in advanced services, would stifle innovation, and would create barriers to entry for entrepreneurs seeking to offer competitive services.

Discussion

IV. USE OF AN INTERFERENCE TEMPERATURE SCHEME FOR LICENSED SPECTRUM WOULD DISRUPT LICENSEES’ RIGHTS TO MAXIMIZE THE BENEFITS OF THEIR SPECTRUM.

The adoption of an interference temperature metric for licensed services would substantially limit the rights of licensees to make full use of their spectrum. This result would not only constitute an unfair *ex post* intrusion into the licensee’s rights, but also would contravene the Commission’s policies toward facilitating market-based mechanisms for spectrum allocation. Luxon believes that in spectrum bands where licensees have exclusive rights to their authorized spectrum, such as the MMDS and ITFS bands, introduction of unlicensed devices via a government-mandated interference temperature metric would drastically curtail these rights. As detailed below, such unlicensed users must be required to negotiate with incumbent licensees to gain access to the licensee’s authorized spectrum in the authorized service area.

The interference temperature concept derives from the *Spectrum Policy Task Force Report*, in which the Task Force recommended a series of steps to increase spectral efficiency.⁷ In noting that “[n]o single regulatory model can or should be applied to all spectrum,” the Task Force advocated adopting “[p]olicies that account for all potential dimensions of spectrum usage (frequency, power, space, and time).”⁸ As a “long-term objective,” the Task Force suggested that the interference temperature metric could be used to quantify acceptable levels of interference and “should form the basis for better defining interference rights.”⁹

The interference temperature approach also emerged in the context of the Commission’s broad-based efforts to promote market-based mechanisms for allocating spectrum resources. As a remedy for the inefficiencies of the current “command and control” spectrum allocation regime, the Task Force recommended that an “exclusive use” model “should be applied to most spectrum” and that such a model is preferable in bands characterized by heavy incumbent use and relatively low transaction costs relative to the spectrum’s value.¹⁰ An exclusive use model promotes efficient spectrum allocation based on: (1) flexibility to adapt to changing market conditions and technological innovations, (2) clearly defined and enforced rights and obligations, (3) exclusivity rights against others who seek spectrum access, and (4) transferable spectrum resources that will provide interested parties with market-based incentives to put spectrum rights to their highest-valued use.¹¹ Exclusive use models promote flexible solutions, reduce the amount of underutilized spectrum and resolve competing spectrum interests.

As the Commission has stated in other public documents, “granting *licensees* additional flexibility to make their licensed bands available to others would increase access to the spectrum

⁷ Spectrum Policy Task Force, *Report*, ET Docket 02-135 (2002) (emphasis added) (“*SPTF Report*”).

⁸ *Id.*, p.4.

⁹ *Id.*, p.34.

¹⁰ *Id.*, pp. 15, 38.

¹¹ *Id.*, pp. 35-36, 38.

and, correspondingly, minimize the impact of spectrum scarcity.”¹² In its recently adopted *Secondary Markets Order*, the Commission identified flexibility as a key policy that would increase the value and utility of spectrum, stating that:

The policies, rules and procedures we adopt herein take important first steps to facilitate significantly broader access to valuable spectrum resources by enabling a wide array of facilities-based providers of broadband and other communications services to enter into spectrum leasing arrangements with Wireless Radio Service licensees. These flexible policies continue our evolution toward greater reliance on the marketplace to expand the scope of available wireless services and devices, leading to more efficient and dynamic use of the important spectrum resource to the ultimate benefit of consumers throughout the country. Facilitating the development of these secondary markets enhances and complements several of the Commission’s major policy initiatives and public interest objectives, including our efforts to encourage the development of broadband services for all Americans, promote increased facilities-based competition among service providers, enhance economic opportunities and access for the provision of communications services by designated entities, and enable development of additional and innovative services in rural areas.¹³

In a recent speech, John B. Muleta, Chief of the Commission’s Wireless Telecommunications Bureau, defined “flexibility” as:

granting *licensees* the maximum possible autonomy to determine the highest valued use of *their* spectrum, subject only to those rules that are necessary to afford reasonable opportunities for access by other spectrum users and to prevent or limit interference among multiple spectrum users. . . . *It also means allowing licensees the right to freely engage in secondary market transactions so they can get the spectrum to its most valued use without government intervention in the process.*¹⁴

In applying the Commission’s objectives and policies to the question of whether an interference temperature metric should be imposed on licensed services, imposing an interference temperature regime cannot be reconciled with the Commission’s policies underpinning the *Secondary Markets Order*. On one hand, the Task Force is focused, in part, on

¹² *Id.*, p. 15. See also *Report and Order and Further Notice of Proposed Rulemaking*, FCC 03-113, 18 FCC Rcd 20604 (2003), ¶ 28 (“*Secondary Markets Order*”).

¹³ See *SPTF Report*, ¶2 (footnote omitted).

¹⁴ See Remarks of John B. Muleta, “The Changing Nature of Spectrum Regulation and Its Impact on Broadband Wireless,” February 24, 2004, Broadband Wireless World Conference, p.5 (emphases added).

expanding access to spectrum “users”; on the other hand, the promotion of secondary markets and the emphasis on flexible use are focused on the rights of “licensees.” The Commission acknowledged this point in the *SPTF Report*, stating that “[i]nterference management becomes even more problematic when and if users have been granted increased flexibility in their spectrum use.”¹⁵ This dichotomy becomes still more difficult to resolve in the context of the “space” dimension of spectrum, notably the interference temperature metric at issue in this proceeding.

It is critical to bear in mind that licensees in the MMDS, ITFS and other services have exclusive rights to their licensed spectrum. Under policies that have evolved and expanded over the years, these rights include the ability of licensees to partition portions of their geographic service area, disaggregate spectrum, lease spectrum to non-licensee third parties, superchannelize by aggregating spectrum pieces into a broader swath, and subchannelize by dividing spectrum into portions that are less than the authorized bandwidth. Moreover, there are no restrictions on a licensee’s ability to itself allow third party use of the space dimension – the licensee has the right to contract with other parties to put the spectrum to its most valued use. By definition, this contractual right must include the licensee’s right to lease or otherwise permit operation on its spectrum beneath the noise floor.

If the Commission were to permit underlay operations in licensed bands, a far better solution would be allow the market to function as the Commission intends by requiring prospective operators of unlicensed devices to negotiate with incumbent licensees to obtain access to spectrum that would operate in the licensee’s authorized service area. This way, the market, not the government, would set the terms of spectrum use, and licensees and spectrum

¹⁵ *SPTF Report*, p.4.

users could mutually agree on a market-by-market, band-by-band basis on the terms of use of the unlicensed underlay. These contractual terms could include the “temperature” of the noise floor, the locations of unlicensed devices, power levels and other technical parameters, as well as allocating costs and responsibilities for monitoring and responding to harmful interference. In bands such as MMDS and ITFS that are heavily crowded with incumbent licensees, a flexible use model remains the most appropriate spectrum policy model.¹⁶

Permitting secondary use by private contract instead of by government fiat also would permit licensees to negotiate their own remedies and enforcement methods so that the Commission’s enforcement role would be narrowed to address instances of market failure – *e.g.*, for users of unlicensed devices that have not contracted with licensees. Rather than create an environment with the potential for inaccurate monitoring and artificial and unfair shifting of costs to licensees, licensees would protect their licensed service via contract, consistent with the flexibility and market-based approach predicated in the *Secondary Markets Order*.

V. EXISTING TECHNOLOGY CANNOT SUPPORT IMPOSITION OF AN INTERFERENCE TEMPERATURE METRIC.

Even if the Commission could lawfully authorize unlicensed operations in licensed bands,¹⁷ there is no record indicating that current technology will permit unlicensed devices to co-exist responsibly with licensed operations in an interference temperature scheme. Indeed, the Commission itself apparently recognizes this fact, given the prospective and speculative nature

¹⁶ Luxon anticipates that the filing and oversight procedures adopted in the *Secondary Markets Order* would apply to agreements for third-party use of spectrum below the noise floor.

¹⁷ Questions have been raised about the Commission’s statutory authority to permit unlicensed operations under Section 301 of the Communications Act of 1934, as amended. *See, e.g.*, Petition for Reconsideration of the American Radio Relay League, ET Docket No. 98-156 (filed February 13, 2002); Petition for Reconsideration of Cingular Wireless LLC, ET Docket No. 98-153 (filed May 22, 2003).

of its discussion in the *Notice*.¹⁸ The ability to measure the interference temperature and operate equipment that automatically responds to interference conditions exists as a concept only.

The Commission suggests three ways in which the interference temperature could theoretically be monitored, all of which would “in principle” measure interference at “various” receiver locations and would “estimate” the cumulative interference level while leaving room for the possibility that harmful interference could in fact occur at other receive sites.¹⁹ Under the first approach, the unlicensed device would measure interference at its location and determine whether its emissions would, in combination with other signals, exceed the interference temperature. This approach fails to take into account that the licensed service may be providing mobile service, such that the receive locations are not fixed. When the receive sites are not at fixed locations, but are in mobile devices, the ability to accurately estimate interference becomes inherently more difficult. Similarly, if the unlicensed devices are mobile, the interference environment would vary as the devices travel from place to place, creating another source of uncertainty and instability.

Under the second approach, the receive sites of the licensed service would measure the interference temperature and communicate the measurements to a central site and be made available to operators and users. Here again, this alternative will not work when the licensee’s or unlicensed users’ receive sites are mobile. In addition, if licensees are taking the “temperature readings,” they could be forced to bear the costs of purchasing, installing and maintaining the appropriate measurement equipment – costs they should not be obligated to incur.

¹⁸ For instance, paragraphs 11-14 of the *Notice* use phrases like “would be,” “might be” and “could be” in defining the possible characteristics of interference temperature monitoring and response equipment, and concludes that “[m]any other variations are possible for optimizing the monitoring and response process to avoid exceeding the temperature cap.”

¹⁹ See *Notice*, ¶ 10.

The third approach would establish a “grid” of monitoring stations that would continuously examine interference and transmit that information to transmitters on a dedicated frequency. While this alternative may appear to be more technically feasible, the Commission provides no information on how the grids would be spaced, who would be responsible for maintaining the monitoring stations or whether there is available spectrum for transmitting the information on a continuous, reliable basis. This raises the specter that licensees will be asked to foot the bill to monitor and mitigate potentially harmful interference caused by others. If, however, a licensee chooses to permit unlicensed use by exercising its exclusive rights as a secondary market lessor, the costs could be shifted contractually to the unlicensed user.

The Commission’s questions also pre-suppose that these monitoring devices – which exist today only on paper – will work perfectly and that signals from unlicensed devices will, in the aggregate, remain below the noise floor. Over time, monitoring equipment may fail or become obsolete, population shifts may change the baseline on which the monitoring system is based, or rogue users may modify their equipment to skirt the monitoring process. As underlay services proliferate, these problems will proliferate as well. No enforcement system can eliminate interference after it happens, and any *post hoc* remedies would have little value to the licensee whose service was disrupted and potentially destroyed through no fault of its own.

With clearly defined and flexible spectrum rights, the secondary markets will allow license holders and new users to account for the licensed service’s specific attributes – for example, whether the services are fixed or mobile, whether operations are on a transmit/receive or receive-only basis, and the like. As the Commission stated in its Working Paper 39:

Interference that may be intolerable in one service might be perfectly acceptable in another. . . . For example, while interference that causes excessive break-ups or dropped calls would be considered unacceptable by the average cell phone

user, a walkie-talkie user, who pays on a pittance for the device and pays no monthly fees, may be willing to accept that interference.²⁰

In light of the theoretical nature of interference listening and response devices and the existence of different service models that exist and will proliferate, the record indicates that it would be premature to adopt an interference temperature metric that would allow unlicensed devices to operate in licensed bands. In particular, comprehensive testing is necessary to determine whether any unlicensed devices can operate and adequately protect authorized license holders from harmful interference. The need for testing is particularly acute because once unlicensed devices are authorized to operate in licensed bands, it will be difficult, if not impossible, to identify and/or remove interfering devices. As MMDS/ITFS industry participants recently stated:

Rather than rush to judgments that could degrade the quality of licensed services and inhibit future technological advances that would increase operating efficiency or provide valuable new services to the public, the Commission should instead undertake a more comprehensive study of ... evolving opportunistic and underlay technologies. Only when it is certain that [opportunistic and underlay technologies] can operate on a secondary, non-interfering basis and that such operations will not undermine innovation by licensees should the Commission seriously consider new rules allowing unlicensed operations [in MMDS/ITFS bands].²¹

If the Commission were to authorize unlicensed use below the noise floor, the incumbent licensee should determine whether *vel non* to permit unlicensed operation in its service area. This would allow the licensed and unlicensed users to not only manage the then-existing interference environment in the particular geographic area, but could also provide a vehicle to ensure that their respective future technology deployments will not adversely affect each other.

²⁰ Carter, Kenneth R., Ahmed Lahjouji and Neal McNeil, “*Unlicensed and Unshackled: A Joint OSP-OET White Paper on Unlicensed Devices and Their Regulatory Issues*,” May 2003, p.46.

²¹ See Reply Comments of the Wireless Communications Association International, Inc., the National ITFS Association and the Catholic Television Network in response to *MDS/ITFS NPRM* (submitted September 8, 2003).

VI. ADOPTING AN INTERFERENCE TEMPERATURE METRIC IN LICENSED BANDS WOULD ADVERSELY AFFECT LICENSEES' ABILITIES TO RAISE CAPITAL AND OFFER ENHANCED COMPETITION.

For Luxon's wireless broadband vision to be fulfilled, significant capital is required for spectrum acquisition, equipment, site access and operating expenses. As previously stated, a key element of Luxon's business plan is the use of licensed spectrum, which offers interference protection and increased power limits, which consequently enables the provision of high-quality, reliable service within defined areas. In Luxon's opinion, licensed spectrum has regulatory and operational certainties that offer clear advantages over other alternatives, and such frequencies ultimately present a more stable investment environment and a greater probability of meaningful competition occurring.

Adopting an interference temperature metric in any licensed band will impede investment unless licensees retain the capacity to negotiate spectrum access for unlicensed services. Permitting unlicensed operations based on an interference temperature metric would encumber the spectrum, would reduce the reliability and quality of service licensed operators can provide, and would ultimately create uncertainty in the investment community. In effect, investors would perceive spectrum as having lesser value if use of the spectrum were shared or encumbered with other users who lack a contractual relationship with the licensee. Moreover, given the inherent inability to eliminate the presence of harmful interference through any existing means, investors would have good reason for concern. Investors also would be concerned that unlicensed operations would hinder licensees' ability to provide innovative services and more technologically advanced services.

As a result, fewer investment dollars would be available, and the available funds might not be invested on favorable terms, which in itself is a disincentive to entrepreneurship.

Inhibiting the ability of operators like Luxon to obtain sufficient funding to complete construction and operate a system obviously is detrimental to fair competition with incumbent operators that are not burdened with regulations that could prevent maximum use of the capacity of the spectrum.

Moreover, permitting unlicensed use in licensed bands would chill innovation. Licensees would have less incentive to innovate and less ability to keep up with competitors that are not encumbered with a spectrum underlay. The combination of an uncertain interference environment, unavailability of funding and an inability to innovate will stop entrepreneurs like Luxon from offering meaningful competition.

Conclusion

In view of the foregoing, Luxon urges the Commission to refrain from imposing an interference temperature regime on licensed spectrum at this time. In the future, as technology advances and testing may prove, adopting a government-supervised interference temperature scheme may be viable. In the meantime, to the extent the Commission may wish to encourage operations below the noise floor, the Commission should continue to permit licensees to enter into contractual relationships if they wish to make their licensed spectrum available to others.

Respectfully submitted,

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